Nanostructured materials for solar cells

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ABSTRACT

The use of both inorganic and organic nanostructured materials in producing high efficiency photovoltaics is discussed in this paper. Recent theoretical results indicate that dramatic improvements in device efficiency may be attainable through the use of semiconductor quantum dots in an ordinary p-i-n solar cell. In addition, it has also recently been demonstrated that quantum dots can also be used to improve conversion efficiencies in polymeric thin film solar cells. A similar improvement in these types of cells has also been observed by employing single wall carbon nanotubes. This relatively new carbon allotrope may assist both in the disassociation of excitons as well as carrier transport through the composite material. This paper reviews the efforts that are currently underway to produce and characterize these nanoscale materials and to exploit their unique properties.

INDEX TERMS

- **INSPEC**
  - **Controlled Indexing**
    II-VI semiconductors , cadmium compounds , carbon nanotubes , carrier mobility , composite materials , copper compounds , dissociation , excitons , indium compounds , nanostructured materials , nanotube devices , photovoltaic effects , polymer films , semiconductor quantum dots , solar cells , ternary semiconductors
  - **Non Controlled Indexing**
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